

Claims:

1. A method of manufacture of a moisture resistant polyurethane prepolymer comprising,

treating an isocyanate material with a chemical substance which  
5 provides hydrogen ions to the isocyanate material to produce an acidified isocyanate material, and

reacting the acidified isocyanate material with an active hydrogen containing material to produce a moisture resistant polyurethane prepolymer.

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2. The method of claim 1 wherein the chemical substance is selected from the group consisting of hydrogen chloride, hydrogen fluoride, hydrogen bromide, phosphoric acid, nitrous acid, nitric acid, sulfuric acid, hypochlorous acid, chlorous acid, 15 chloric acid, perchloric acid, benzoyl chloride and thionyl chloride.

3. The method of claim 2 wherein the isocyanate material is selected from the group consisting of organic isocyanates and organic polyisocyanate.

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4. The method of claim 2 wherein the isocyanate material is selected from the group consisting of 1,6-hexamethylene diisocyanate, isophorone diisocyanate, 1,4-cyclohexane diisocyanate, 4,4'dicyclohexylmethane diisocyanate, 1,4-xylylene diisocyanate, 1,4-phenylene diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene 25 diisocyanate, 4,4'diphenylmethane diisocyanate, 2,4'diphenylmethane diisocyanate, polymethylene polyphenylene polyisocyanates and 1,5 naphthylene diisocyanate.

30 5. The method of claim 4 wherein the isocyanate material is selected from the group consisting of 4,4'diphenylmethane diisocyanate, 2,4'diphenylmethane diisocyanate, polymethylene polyphenylene polyisocyanates.

6. The method of claim 5 wherein the active hydrogen containing material is selected from the group consisting of polyether polyols, polyester polyols, hydrocarbon polyols, and amine functional polyols.

7. The method of claim 2 wherein the isocyanate material is an  
5 isocyanate-terminated prepolymer.

8. The method of claim 6 wherein the acid is selected from the group consisting of anhydrous hydrochloric acid, hydrochloric acid, and phosphoric acid.

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9. The method of claim 8 wherein the acid is anhydrous hydrochloric acid.

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10. The method of claim 9 wherein the active hydrogen containing material is a polyether polyol having a functionality of about 2 to about 4, and an OH value of about 47 to about 55 mg KOH/g.

11. A method for producing a polyurethane rebonded foam product having improved moisture resistance comprising,

20 treating an isocyanate material with a chemical substance which provides hydrogen ions to the isocyanate material to produce an acidified isocyanate material,

reacting the acidified isocyanate material with an active hydrogen containing material to produce a moisture resistant  
25 polyurethane prepolymer,

applying the moisture resistant polyurethane prepolymer to polyurethane foam crumb to produce treated foam crumb, and

curing the treated foam crumb to produce a polyurethane rebonded foam product having improved moisture resistance.

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12. The method of claim 11 wherein the isocyanate material is selected from the group consisting of organic isocyanates and organic polyisocyanate.

13. The method of claim 11 wherein the chemical substance is selected from the group consisting of hydrogen chloride, hydrogen flouride, hydrogen bromide, phosphoric acid, nitrous acid, nitric acid, sulfurous acid, sulfuric acid, hypochlorous acid, chlorous acid, chloric acid, perchloric acid, benzoyl chloride and thionyl chloride.

14. The method of claim 13 wherein the isocyanate material is selected from the group consisting of 1,6-hexamethylene diisocyanate, isophorone diisocyanate, 1,4-cyclohexane diisocyanate,  
10 4,4'dicyclohexylmethane diisocyanate, 1,4-xylylene diisocyanate, 1,4-phenylene diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, 4,4'diphenylmethane diisocyanate, 2,4'diphenylmethane diisocyanate, polymethylene polyphenylene polyisocyanates and 1,5 naphthylene diisocyanate.

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15. The method of claim 14 wherein the isocyanate material is selected from the group consisting of 4,4'diphenylmethane diisocyanate, 2,4'diphenylmethane diisocyanate, polymethylene polyphenylene polyisocyanates.

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16. The method of claim 15 wherein the active hydrogen containing material is selected from the group consisting of polyether polyols, polyester polyols, hydrocarbon polyols, and amine functional polyols.

25 17. The method of claim 16 wherein the isocyanate material is an isocyanate-terminated prepolymer.

18. The method of claim 12 wherein the acid is selected from the group consisting of anhydrous hydrogen chloride, hydrochloric acid,  
30 and phosphoric acid.

19. The method of claim 15 wherein the acid is anhydrous hydrogen chloride.

20. The method of claim 18 wherein the active hydrogen containing material is a polyether polyol having a functionality of about 2 to about 4, and an OH value of about 47 to about 55 mg KOH/g.

21. The method of claim 11 wherein the curing is performed with  
5 steam.

22. A moisture resistant polyurethane prepolymer that is the reaction product of an acidified isocyanate material formed by treating an isocyanate material treated with a chemical substance which provides  
10 hydrogen ions to the isocyanate material, and

reacting the acidified isocyanate material with an active hydrogen containing material to produce a moisture resistant polyurethane prepolymer.

15 23. The method of claim 22 wherein the chemical substance is selected from the group consisting of hydrogen chloride, hydrogen flouride, hydrogen bromide, phosphoric acid, nitrous acid, nitric acid, sulfurous acid, sulfuric acid, hypochlorous acid, chlorous acid, chloric acid, perchloric acid, benzoyl chloride and thionyl  
20 chloride.

24. The method of claim 23 wherein the isocyanate material is selected from the group consisting of organic isocyanates and organic polyisocyanates.

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25. The method of claim 24 wherein the isocyanate material is selected from the group consisting of 1,6-hexamethylene diisocyanate, isophorone diisocyanate, 1,4-cyclohexane diisocyanate, 4,4'dicyclohexylmethane diisocyanate, 1,4-xylylene diisocyanate, 1,4-  
30 phenylene diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, 4,4'diphenylmethane diisocyanate, 2,4'diphenylmethane diisocyanate, polymethylene polyphenylene polyisocyanates and 1,5 naphthylene diisocyanate. Mixtures of

26. The method of claim 25 wherein the isocyanate material is selected from the group consisting of 4,4'diphenylmethane diisocyanate, 2,4'diphenylmethane diisocyanate, polymethylene polyphenylene polyisocyanates.

5 27. The method of claim 26 wherein the active hydrogen containing material is selected from the group consisting of polyether polyols, polyester polyols, hydrocarbon polyols, and amine functional polyols.

28. The method of claim 23 wherein the isocyanate material is an  
10 isocyanate-terminated prepolymer.

29. The method of claim 25 wherein the chemical substance is anhydrous hydrochloric acid.

15 30. The method of claim 29 wherein the active hydrogen containing material is a polyether polyol having a functionality of about 2 to about 4, and an OH value of about 47 to about 55 mg KOH/g.

31. A moisture resistant polyurethane prepolymer that is the reaction  
20 product of an acidified isocyanate material formed by treating a blend of isocyanate A, Isocyanate B, and isocyanate C with anhydrous hydrogen chloride, and  
reacting the acidified isocyanate material with a polyether triol to produce a moisture resistant polyurethane prepolymer,  
25 wherein isocyanate A is a blend of 75% polymeric diphenylmethane diisocyanate, and 25% 4,4' diphenylmethane diisocyanate, isocyanate B is polymeric diphenylmethane diisocyanate, and isocyanate C is 4,4' diphenylmethane diisocyanate.

30 32. The prepolymer of claim 31 wherein in said blend of isocyanate A, isocyanate B and isocyanate C, isocyanate A is present in a concentration of about 56.3%, isocyanate B is present in a concentration of about 21.1%, and isocyanate c is present in a

concentration of about 22.6%.

33. The prepolymer of claim 32 wherein the acidified isocyanate material has 1125 ppm of hydrogen chloride.

5 34. A moisture resistant polyurethane prepolymer that is the reaction product of an acidified isocyanate material formed by treating a blend of isocyanate A and isocyanate C with anhydrous hydrogen chloride, and

reacting the acidified isocyanate material with a polyether  
10 triol to produce a moisture resistant polyurethane prepolymer, wherein isocyanate A is a blend of 75% polymeric diphenylmethane diisocyanate, and 25% 4,4' diphenylmethane diisocyanate, and isocyanate C is 4,4' diphenylmethane diisocyanate.

15 35. The prepolymer of claim 34 wherein in said blend of isocyanate A, and isocyanate C, isocyanate A is present in a concentration of about 84.4%, and isocyanate c is present in a concentration of about 15.6

36. The prepolymer of claim 35 wherein the acidified isocyanate  
20 material has about 1688 ppm of hydrogen chloride.